

FORM NO-1350

U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY DOCKET NUMBER
LSP-0015

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO (if known see 37 C.F.R. 1.5)

10/048095

INTERNATIONAL APPLICATION NO.
PCT/EP00/07152

INTERNATIONAL FILING DATE
26 July 2000

PRIORITY DATE CLAIMED
29 July 1999

TITLE OF INVENTION METHOD FOR POWER OPTIMIZATION IN A VEHICLE/TRAIN HAVING AN EFFICIENCY THAT DEPENDS ON THE OPERATING POINT

APPLICANT(S) FOR DO/EO/US **Franke RUDIGER, Peter TERWIESCH, Markus MEYER, Christian KLOSE and Karl-Hermann KETTELER**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

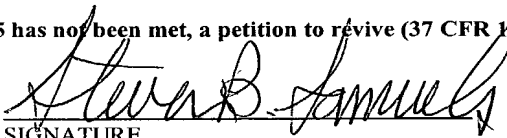
1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) 35 U.S.C. 371(c)(4).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
- A copy of the Published PCT Application by WIPO under No. WO 01/08959, including the search report.
- A copy of the International Preliminary Examination report, including amended claims 1 and 2 under Article 34.
- An English translation of the Response to the Written Opinion.

EXPRESS MAIL Mailing Label No. **EL 899365916 US**
Date of Deposit: **24 January 2002**

EL899365916US

U.S. APPLICATION NO. 10/048095		INTERNATIONAL APPLICATION NO. PCT/EP00/07152		ATTORNEY DOCKET NUMBER LSP-0015					
17. <u> </u> The following fees are submitted: Basic National Fee (37 CFR 1.492(a)(1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... \$1,040.00 International preliminary examination fee (37 CFR 1.482 not paid to USPTO but International Search Report has been prepared by the EPO or JPO..... \$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... \$740.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)..... \$710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)..... \$100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>				<u>CALCULATIONS</u> <u>PTO USE ONLY</u>					
				\$890.00					
				Surcharge of \$130.00 for furnishing the oath or declaration later than <u> </u> 20 <u> </u> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		\$			
				Claims	Number Filed	Number Extra	Rate		
				Total claims	2- 20 =	0	X \$18.00	\$	
Independent Claims	2- 3 =	0	x \$84.00	\$					
Multiple dependent claims(s) (if applicable)			+ \$280.00	\$					
TOTAL OF ABOVE CALCULATIONS =				\$890.00					
<u> </u> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$					
SUBTOTAL =				\$890.00					
Processing fee of \$130.00 for furnishing the English translation later than <u> </u> 20 <u> </u> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	\$				
TOTAL NATIONAL FEE =				\$890.00					
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+					
TOTAL FEES ENCLOSED =				\$890.00					
				Amount to be:					
				refunded	\$				
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a. <input checked="" type="checkbox"/> A check in the amount of \$ 890.00 to cover the above fee is enclosed. b. <u> </u> Please charge my Deposit Account No. 23-3050 in the amount of \$ <u> </u> to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23-3050. A duplicate copy of this sheet is enclosed.									
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.									
SEND ALL CORRESPONDENCE TO: Steven B. Samuels Woodcock Washburn LLP One Liberty Place - 46th Floor Philadelphia, PA 19103 (215) 568-3100									
				 SIGNATURE					
				Steven B. Samuels NAME					
				37,711 REGISTRATION NUMBER					

DOCKET NO: LSP-0015

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Rudiger, et al.

Serial No.: 10/048,095

Group Art Unit: Not Assigned Yet

Filing Date: January 24, 2002

Examiner: Not Assigned Yet

**For: METHOD FOR POWER OPTIMIZATION IN VEHICLE/TRAIN HAVING
 AN EFFICIENCY THAT DEPENDS ON THE OPERATION POINT**

**WITHDRAWAL AS ATTORNEY AND
 CHANGE OF CORRESPONDENCE AND MAINTENANCE FEE ADDRESS**

The following attorneys or agents apply to withdraw in the above identified application:

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DOCKET NO: LSP-0015**- 2 -****PATENT**

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Scott E. Scioh	Registration No. 47,930

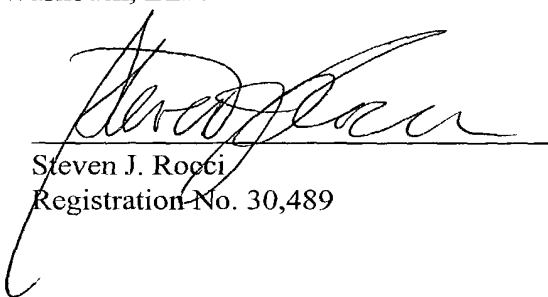
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ENGLAND

The undersigned attorney is authorized to sign on behalf of the above-listed attorneys each of whom are attorneys at the firm Woodcock Washburn, LLP.

Date:

4/9/02


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2/PRTS

107048095
531 Rec'd PCT 24 JAN 2002

Method for power optimization in a vehicle/train having
an efficiency that depends on the operating point

Description

5

The invention relates to a method for power optimization in a vehicle/train according to the preamble of claim 1.

10 During the planning of journeys and the drafting of schedules for rail traffic, time reserves for unforeseen events and adverse operating conditions are included in the plans. Since, during real journeys, the operating conditions are typically more favorable than
15 those assumed during planning, the time reserves created by this are available for other purposes. A particularly practical use of the time reserves resides in the saving of power by means of a suitable travel mode.

20

Previously known and used methods for power minimization are mostly based on the assumption that a travel mode comprising the constituents maximum acceleration - travel at constant speed - coasting -
25 maximum retardation is optimum in power terms. In this case, the mechanical tractive power which is needed to accelerate the vehicle is minimized. For verification, a linear dynamic train model is used, in particular no account being taken of any term which describes the
30 quadratic relationship between speed and travel resistance.

In DD 255 132 A1, this basic assumption is expanded by subdividing a total route into a number of sections, so
35 that in each section the slope resistance of the route is constant.

- 2 -

In EP 0 467 377 B1, the subdivision of the overall route into a number of sections is introduced in such a way that in each section the permissible maximum speed is constant. The travel mode comprising the
5 constituents maximum acceleration - travel at constant speed - maximum retardation is repeated in each section. Coasting is therefore dispensed with.

EP 0 755 840 A1 does not describe a practical method
10 for power optimization but instead explains a general system structure with which power optimization can also be implemented. A cycle comprising acceleration - travel at constant speed - retardation and braking is listed as an example.

15 The invention is based on the object of specifying an improved method for power optimization with regard to the time reserves included in the planning of a schedule of a vehicle/train.

20 This object is achieved, in conjunction with the preamble, by the features specified in claim 1.

The advantage which can be achieved by the invention is
25 in particular that, by taking into account the dependence of the vehicle efficiency on the operating point in the optimization algorithm, instead of the mechanical tractive power, it is the power primarily used, such as the electrical power in electric rail
30 vehicles, which is minimized.

An advantageous refinement of the invention is identified in the subclaim.

35 Further advantages of the proposed method emerge from the following description.

Patent Claims

1. A method for the power-optimal travel mode of a vehicle/train, the time reserves for unforeseen events and adverse operating conditions included when planning schedules being available for saving power by means of a power-optimal travel mode, wherein the dependence of the vehicle efficiency, defined as the quotient of the tractive power provided - the output power - and the input power needed for this purpose, on the tractive force and/or speed and/or temperature is used for the purpose of optimizing the power with regard to the time reserves.
2. A method for the power-optimal travel mode of a vehicle/train, the time reserves for unforeseen events and adverse operating conditions included when planning schedules being available for saving power by means of a power-optimal travel mode, wherein the dependence of the vehicle power loss, defined as the difference between the input and the output power, on the tractive force and/or speed and/or temperature is used for the purpose of optimizing the power with regard to the time reserves.

Method for power optimization in a vehicle/train having
an efficiency that depends on the operating point

Abstract

A method for power optimization in a vehicle/train, using time reserves included when planning a schedule, is proposed. In order to achieve a power-saving travel mode with the aid of an optimization algorithm, the dependence of the vehicle efficiency or the power loss on the operating point is taken into account.

Relevant figure: Fig. 1

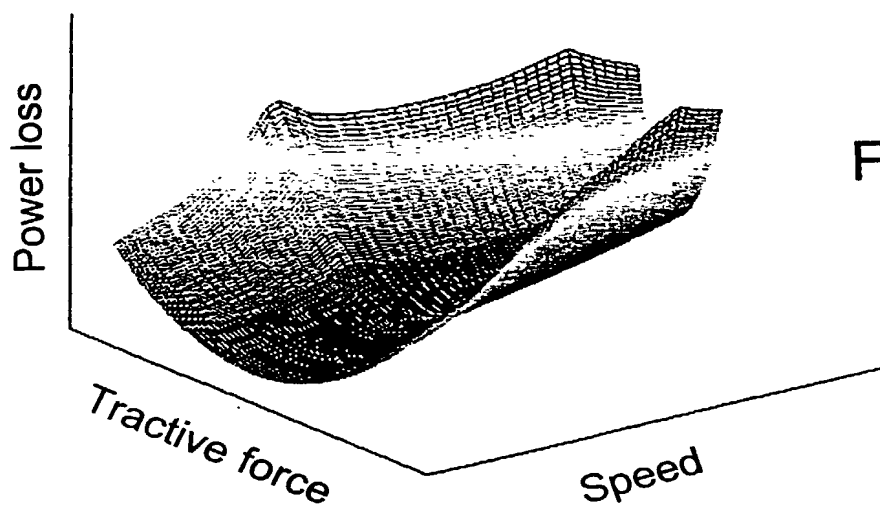


Fig. 1

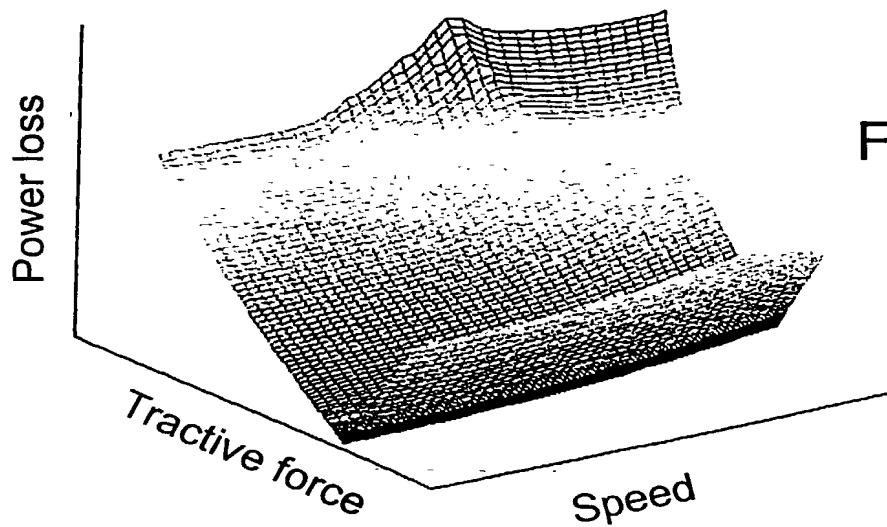


Fig. 2

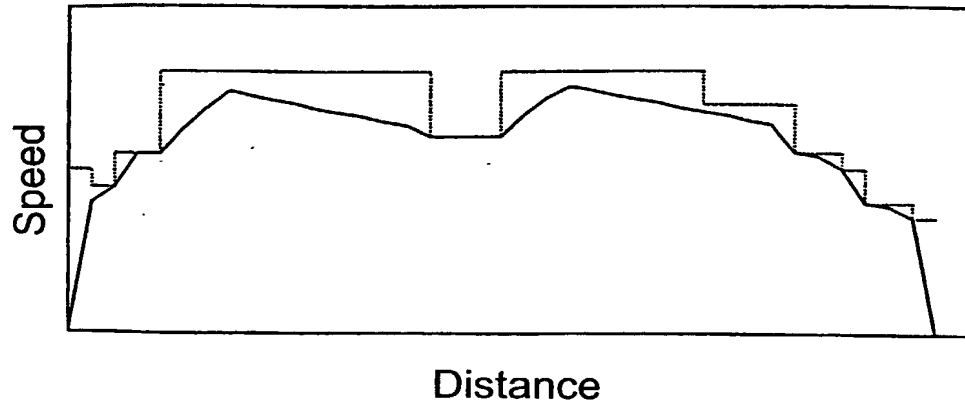


Fig. 3 (Prior art)

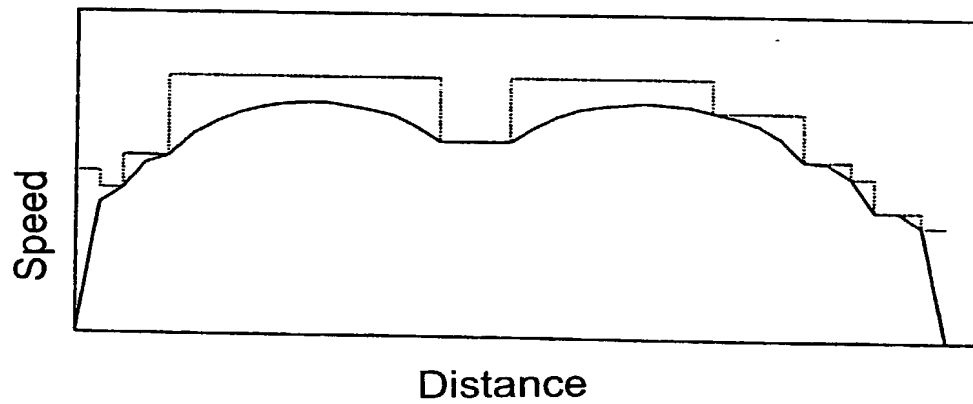


Fig. 4

Declaration and Power of Attorney for Patent Application Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an
 Eides Statt:

As a below named inventor, I hereby declare that:

daß mein Wohnsitz, meine Postanschrift und meine
 Staatsangehörigkeit den im nachstehenden nach meinem Namen
 aufgeführten Angaben entsprechen, daß ich nach bestem Wissen
 der ursprüngliche, erste und alleinige Erfinder (falls nachstehend
 nur ein Name angegeben ist) oder ein ursprünglicher, erster und
 Miterfinder (falls nachstehend mehrere Namen aufgeführt sind)
 des Gegenstandes bin, für den dieser Antrag gestellt wird und für
 den ein Patent für die Erfindung mit folgendem Titel
 beantragt wird:

My residence, post office address and citizenship are as stated
 next to my name.
 I believe I am the original, first and sole inventor (if only one
 name is listed below) or an original, first and joint inventor (if
 plural names are listed below) of the subject matter which is
 claimed and for which a patent is sought on the invention
 entitled

deren Beschreibung hier beigelegt ist, es sei denn (in diesem
 Falle Zutreffendes bitte ankreuzen), diese Erfindung

the specification of which is attached hereto unless the
 following box is checked:

☒ wurde angemeldet am / was filed on: **26 July 2000**

unter der US-Anmeldenummer oder unter der Internationalen Anmeldenummer im Rahmen
 des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) /
 as United States Application Number or PCT International Application Number: **PCT/EP00/07152**

und am / and was amended on (if applicable) **3 September 2001** abgeändert (falls zutreffend).

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen
 Patentanmeldung, einschließlich der Ansprüche, die eventuell
 durch einen oben erwähnten Zusatzantrag abgeändert wurde,
 durchgesehen und verstanden habe.

I hereby state that I have reviewed and understand the contents
 of the above identified specification, including the claims, as
 amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung jeglicher
 Informationen an, die zur Prüfung der Patentfähigkeit in
 Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von
 Belang sind.

I acknowledge the duty to disclose information which is
 material to patentability as defined in Title 37, Code of Federal
 Regulations, § 1.56.

300444095.022002

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title 35, United States Code, § US-Code, § 119 (a)-(d), bzw. § 365(b) aller unten aufgeführten Auslandsanmeldungen für Patente oder Erfinderurkunden, oder § 365(a) aller PCT internationalen Anmeldungen, welche wenigstens ein Land ausser den Vereinigten Staaten von Amerika benennen, und habe nachstehend durch ankreuzen sämtliche Auslandsanmeldungen für Patente bzw. Erfinderurkunden oder PCT internationale Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung, für welche Priorität beansprucht wird, vorangeht.

I hereby claim foreign priority under Title 35, 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications / Frühere ausländische Anmeldungen

(Number)
(Nummer)(Country)
(Land)(Filing Date: day/month/year)
(Anmeldetag : tag/monat/jahr)Priority Not Claimed
Priorität nicht beansprucht

DE 199 35 351.4

Germany

29 July 1999

☐☐

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application No.)
(Aktenzeichen)(Filing Date: day/month/year)
(Anmeldetag : tag/monat/jahr)

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I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application No.)
(Aktenzeichen)(Filing Date: day/month/year)
(Anmeldetag : tag/monat/jahr)(Status) (patented, pending, abandoned)
(Status) (patentiert, schwebend, aufgegeben)

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10049095.0729062

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

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Postanschrift / Send Correspondence to:

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Vor- und Zuname des einzigen oder ersten Erfinders/Full name of sole or first inventor:	
RUDIGER FRANKE	
Unterschrift des einzigen oder ersten Erfinders / Inventor's signature:	Datum /
Date: 17.5.2002	
Wohnsitz / Residence: Fritz-Frey-Strasse 2, 69121 Heidelberg, Germany	
Staatsangehörigkeit / Citizenship: DE	
Postanschrift / Post Office Address:	
Vor- und Zuname des zweiten Erfinders (falls zutreffend) / Full name of second joint inventor, if any:	
PETER TERWIESCH	
Unterschrift des zweiten Erfinders / Second inventor's signature:	Datum / Date:
Wohnsitz / Residence: Gartenweg 459, CH-5512 Wohlenschwil, Switzerland	
Staatsangehörigkeit / Citizenship: CH	
Postanschrift / Post Office Address:	

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